

## Science teaching for rural education: analyzing the school's governing documents

### ARTICLE

1

Aldefran Aderson da Silva Souza<sup>i</sup>

Programa de Pós-Graduação em Ensino, Mossoró, RN, Brasil

Leonardo Alcântara Alves<sup>ii</sup>

Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte, Apodi, RN, Brasil

### Abstract

It is noticeable that Science teaching has faced difficulties from students, especially when is limited to the transmission of complex scientific concepts. Within Rural Education, the degree of complexity becomes even higher, increasingly harming these subjects. Based on Moura (2012) and Villela (2014), we aim to develop a documentary of the material that govern education, such as the BNCC, the DCNs and the PPP of a rural school, in order to understand the teacher proposals in that context. For this, after choosing the *corpus*, content analysis (Bardin, 2011) was carried out on the material. As results, it was possible to infer 5 categories: i) Educational Purpose; ii) Science Teaching; iii) Participatory Education; iv) Educational Diversity; v) Didactic Skills. Finally, we understand that problems can arise due to the lack of continuous training of teachers and teaching focused on the student's needs.

**Keywords:** Rural Education. Science Teaching. Documental analysis.

### O ensino de ciências para Educação do Campo: analisando os documentos que regem a escola

### Resumo

É perceptível que o Ensino de Ciências vem enfrentando dificuldades por parte dos alunos, principalmente quando se limita à transmissão de conceitos científicos complexos. Dentro da Educação do Campo, o grau de complexidade se torna ainda mais elevado, prejudicando cada vez mais esses sujeitos. Com base em Moura (2012) e Villela (2014), objetivamos desenvolver uma análise documental dos materiais que regem a educação, como a BNCC, as DCNs e o PPP de uma escola do campo, de modo a entender as propostas de ensino no referido contexto. Para isso, após escolha do *corpus*, foi realizada a análise de conteúdo (Bardin, 2011) no material. Como resultados, foi possível inferir 5 categorias: i) Finalidade Educacional; ii) Ensino de Ciências; iii) Educação Participativa; iv) Diversidade Educativa; v) Competências Didáticas. Por fim, entendemos que as problemáticas podem emergir pela falta de formação continuada dos professores e de um ensino voltado para a necessidade do aluno.

**Palavras-chave:** Educação do Campo. Ensino de Ciências. Análise documental.

## 1 Introduction

2

Over the years, science teaching has become widespread as a learning process based on complexity, generating discouragement and not arousing the student's desire to learn. As a result, most of this public is criticized and strongly rejected (Coelho, 2018). In an effort to understand these difficulties faced by students, especially those from rural areas, it can be seen that these implications are largely caused by common conceptual errors made during each student's school career, as well as by the traditionalism that teachers and educational institutions use when discussing knowledge (Dos Santos *et al.*, 2011).

Faced with this fact, several researchers are looking for methodological proposals to solve or alleviate this lack of student connection with new content, especially those involving the natural sciences (Gonçalves; Brick, 2017). Following this direction, it can be seen that when there is an explanation that is focused on everyday examples or approached through practical and experimental processes, the learning coefficient tends to rise.

Certainly, in the midst of the complexity of the educational scenario, science teaching should be carried out with more practical or experimental actions close to the students' reality, aimed at improving their quality of life, or through reflective studies that contribute to the active participation of students in decision-making corresponding to the scientific environment, as well as the search for solutions to remedy the implications of socio-environmental impacts. However, for this to happen, education professionals need to be prepared to be able to carry out this mediation, something that must be supported by continuing education, as well as specialization, master's and doctoral courses.

In this context, and seeking to understand how official documents guide the activities of science teachers in a rural school, we present our research question: What can the Pedagogical Political Project (PPP), the National Common Core Curriculum (BNCC) and the National Curriculum Guidelines for the training of basic education teachers (DCNs) tell us about science teaching in a rural school?

Based on the documentary analysis presented here, it should also be noted that our study is justified, initially, because it differs from other works, in addition to the fact that there is an insufficient number of studies found that seek to discuss the relationship between science teaching and rural education as an innovative practice. In this way, we emphasize that these central axes become essential elements that drive us to work on this theme.

It is also worth noting that the problem identified arises from my work as a professional with a degree in rural education and is supported by the respective authors studied. Thus, seeing the need that exists especially in this educational institution, which is the field of research, we intend to develop this work with the aim of bringing contributions to teachers who work in the field, as well as to future teachers who are being trained in undergraduate courses.

## 2 Methodology

In order to meet the proposed objectives, it was possible to carry out a documentary analysis of the official documents governing basic education. According to Guba and Lincoln (1981) *apud* Lüdke and André (2012), documents are reliable sources that offer us various advantages, such as consultations during and after the formulation of theoretical research, they can be reviewed with a focus on different studies, and they are a material that we should only dedicate to selecting accurate information.

The materials analyzed followed the criteria of content analysis. According to its main theoretical basis, Bardin (2011, p. 15), "content analysis is a constantly improving set of methodological tools that are applied to extremely diverse discourses (contents and containers)". Following this instruction and in order to meet the research objective, we analyzed the PPP of a rural school located in the municipality of Upanema/RN, the BNCC and the DCNs for basic education teacher training.

From this perspective, and based on the analysis of the material worked on in our research *corpus*, categories were created *a posteriori*, which helped to organize and group

ideas for better understanding by the reader. It was therefore possible to create five categories, namely: i) Educational Purpose; ii) Science Teaching; iii) Participatory Education; iv) Educational Diversity; v) Teaching Skills. These will be presented and discussed in the following chapter.

4

## 3 Results and Discussion

We understand the PPP as a project that plans actions with the intention of realizing a prosperous future, with transformative proposals that can be significant in the lives of students, active participants in this educational cycle. It is "political" because it maintains a commitment to the civic education of the individuals present in society, and "pedagogical" is associated with the term political, because it deals with training and educational contributions to the subjects, linked entirely to the school education process (Veiga, 1998).

Based on these concepts, the PPP is defined as a process of argumentation and reflective discussions, seen as democratic, in which the subjects of society are included and given the opportunity to put forward their ideas. However, it is essential that the formation of this group also triggers the search for alternatives and improvements that can strengthen educational links and the school's structural foundations.

In view of these considerations, it is understood that the Pedagogical Political Project (PPP) is a fundamental document for the school, as it outlines the planning of educational actions. However, it is necessary for the PPP to be revised and updated every school year, with the priority participation of the school community, including management, pedagogical coordination and other education professionals, as well as representatives of the civil community, maintaining a democratic dialog and thus including all the actions of a school's educational process.

Another document analyzed refers to the National Curriculum Guidelines (DCNs) for the training of basic education teachers (Brazil, 2020). This reference curriculum is of great importance, as it brings with it pertinent updates to the National Common Curricular

Base (BNCC) (2018). The DCNs guide the continuity of teaching through ongoing training, so that teaching practice is increasingly strengthened.

As an important factor for science teaching, continuing teacher training has become an essential component for its qualification. According to the document, "[...] as formative agents of knowledge and cultures, as well as mentors of their students on the paths of learning, for the constitution of competences, aiming at the complex performance of their social practice and qualification for work" (Brasil, 2020, p. 02). Thus, we see that up-to-date teaching provides satisfaction for students and teachers, making it an important step towards meaningful learning.

For a final analysis, we can study the National Common Core Curriculum, the normative document that governs all the others and defines the essential knowledge that students should learn during basic education. Updated in 2022, the BNCC provides a complement to the document previously made available, with regard to issues involving the inclusion of computer science. The study identifies central axes such as equality of learning and the integral formation of the student, which emphasize the importance of skills and their relevance to students' lives.

The curricular and normative documents analyzed became essential, as they make it possible to understand how teaching strategies, pedagogical guidelines and the contextual connection of knowledge objects with the students' socio-cultural reality are thought out and organized, so that, based on this curricular basis, teachers can develop their teaching methodologies, promoting the mediation of the skills required for each year of teaching.

The data analysis was organized using Bardin's (2011) Content Analysis method. According to the author, this method can be understood as "[...] a research technique which, through an objective, systematic and quantitative description of the manifest content of communications, aims to interpret these same communications" (p. 42). This approach contributes to better work performance and the articulation of ideas.

### 3.1 Official Documents Analyzed

Table 1 below shows the first category of analysis, entitled "Educational purpose". This category discusses the importance of understanding how the teaching to be carried out by teachers is directed towards the reality of a rural school. Such understandings are fundamental for the effective planning and execution of a teaching process that is concerned with working on its activities for student development in a context that prioritizes the integration of knowledge.

Table 1. Data to illustrate the Educational Purpose category

Category	Registration unit	Context unit
Educational purpose	Quality Integration	<p>"The aim is to train citizens who are capable of analyzing, understanding and intervening in reality, with a view to human well-being, on a personal and collective level. To this end, this process must develop creativity, critical thinking, the ability to analyze and synthesize, self-knowledge, socialization, autonomy and responsibility" (PPP, 2020, p. 29).</p> <p>"To provide quality teaching aimed at the all-round development of students, considering cognitive, affective, psychomotor and socio-cultural aspects through well-defined proposals" (PPP, 2020, p.48).</p> <p>"The search for quality also presupposes the principle of democratic management as a guideline for building a school that values the relationships established by individuals in their daily lives, with the aim of ensuring learning geared towards the needs and success of the student, so that knowledge can be perceived and built from the integration of the various areas of human knowledge and not in an isolated and fragmented way" (PPP, 2020, p. 09).</p> <p>"Stimulating innovation and creativity by contributing, through education, to the development of society and respect for the environment" (PPP, 2020, p. 20).</p> <p>"[...] guaranteeing the set of essential learning for Brazilian students, their integral development through the ten general competences for Basic Education, supporting the choices necessary for the realization of their life projects and the continuity of studies" (Brasil, 2018, p. 05).</p> <p>"[...] Basic Education should aim for global human formation and development, which implies understanding the complexity and non-linearity of this development, breaking with reductionist views that favor either the intellectual</p>



---

(cognitive) dimension or the affective dimension" (Brasil, 2018, p. 14).

---

Source: PPP (2020) and Brasil (2018)

According to Table 1, there are four clippings from the Pedagogical Political Project and two from the Common National Curriculum Base, totaling six clippings from the context unit. This category explicitly shows that the school's educational purpose is aligned with the guidelines of the BNCC, which aims to provide a quality education with comprehensive training. This approach considers the various aspects that surround human beings, so that they become reflective and interventionist citizens, i.e. subjects who contribute to the good development of society.

According to Brasil (2018, p.14):

[...] the concept of comprehensive education to which the BNCC is committed refers to the intentional construction of educational processes that promote learning in tune with the needs, possibilities and interests of students and also with the challenges of contemporary society. This means considering the different childhoods and youths, the various youth cultures and their potential to create new ways of existing.

This promulgation takes place through the state, which must guarantee the provision of free, quality basic education, without any selection requirements. Access to schooling is of the utmost importance for all social classes, as is staying in school, socializing, interacting and maximizing essential learning.

Following this reflection, Barbosa (2014, *et al.*, p. 2892) seeks to clarify that school is, above all, a space for "relevant and socially significant learning", capable of enabling students to "experience ethical and aesthetic experiences with other children and cultural groups, which broaden their standards of reference and identities in the dialogue and knowledge of diversity" (Brasil, 2010, p. 26).

In this context, we can see that the process of building knowledge is not only developed through the cognitive aspect, as the affective aspect is also extremely important and positively influences this action. In this way, it is possible to point out that we can learn

in a variety of ways, be it through dialog, interaction, investigation, reflection, imagination or even moments of recreation.

According to Freire (1996, p. 22) "the school seeks to awaken in professionals the search for the knowledge necessary to return work that motivates the student, that makes them want to learn". In other words, it seeks teaching and learning that takes these specificities into account, with a very diversified methodology, seeking meaningful learning.

By understanding the role of the school, we are fully aware that the role of the teaching professional is to mediate between the object of knowledge and the student. This action aims to make them ethical citizens, enabling them to access and appropriate essential skills in an environment that contributes to the development of meaningful learning and favors the formation of subjects, permeated by integrative and democratic practices.

In line with this discussion, we seek to point out the importance of continuing education processes for teachers, who are important players in the process of mediating the construction of student knowledge. As Nóvoa mentions, "The cycle of professional development is completed with continuing education" (2019, p. 10). In this way, it is possible to understand the importance of taking courses and seeking updates in the field, so that it is possible to diversify methodologies.

In the literal sense, we encourage the development of continuous training and talk about its positive actions, but we also recognize the difficulties encountered during studies in postgraduate courses or other training sectors, such as the excessive workload of teachers, family responsibilities, economic issues, among other factors. Faced with situations like these, continuity is seen as complicated, but not impossible.

Continuing our analysis, "Science Teaching" is the second category to be discussed in our research. It is important to show how the BNCC defines this teaching and how the school's PPP plans and guides the implementation of these classes, so that we can understand the current institutional proposals. We are well aware that it refers to a curricular component (or set of curricular components) which, over time, has become the target of criticism, pointing to the skills as complex and making it difficult for students to



learn. Knowing this, we analyzed the chosen documents in detail and, with the data obtained, we formulated sections that address important aspects of this teaching in the educational context that we seek to understand in this work. This data has been organized and is presented in Table 2 below.

9

Table 2. Data to illustrate the Science Teaching category

Category	Registration unit	Context unit
Science Teaching	Objectives Practice	<p>Science teaching aims to "offer students knowledge about their own nature and make them understand their role in the environment in which they are inserted, as a transforming agent through interaction" (PPP, 2020, p. 33). "Therefore, throughout elementary school, the area of Natural Sciences is committed to the development of scientific literacy, which involves the ability to understand and interpret the world (natural, social and technological), but also to transform it based on the theoretical and procedural contributions of the sciences" (Brasil, 2018, p. 321).</p> <p>"[...] Science teaching should promote situations in which students can:</p> <ul style="list-style-type: none"> <li>- Observe the world around them and ask questions.</li> <li>- Analyze demands, outline problems and plan investigations.</li> <li>- Propose hypotheses." (Brasil, 2018, p. 322-323)</li> </ul>

Source: PPP (2020) and Brasil (2018)

The conceptions presented on Science Teaching reflect a lot on the formation of the being as a whole, giving students the ability to understand the world around them and, from this opportunity, reflect on their daily actions, discuss and "take a position on food, medicines, fuels, transportation, communications, contraception, sanitation and maintaining life on Earth, among many other topics, ethical, political and cultural knowledge as well as scientific knowledge is essential" (Brasil, 2018, p. 321).

All of the above refers to the characteristics of a person who exercises their citizenship because, throughout their student career, they have managed to develop the skills inherent in Scientific-Technological Literacy.<sup>1</sup> "This implies that science education

<sup>1</sup> We are aware of the theoretical concept of the subject, but we don't intend to delve into this discussion, so we'll just present the concept for better understanding. Scientific-technological literacy refers to teaching that

should be part of the citizen's education so that they can understand, give their opinion and make decisions based on an understanding of scientific progress and the risks and conflicts of interest contained therein" (Moura, 2012, p. 20). With these beneficial actions for society, it is possible to justify that, as well as the curricula, the practices developed in formal education contribute to the formation of the whole being.

It is likely that basic education faces a lot of fragmentation, which means that many people are not involved in decision-making and are not interested in science, because they don't understand what it is. When questioning the reason for this lack of capacity, we soon identified that, throughout their student journey, these individuals did not receive a scientific education that would help them in their day-to-day reflections (Moura, 2012). It would be great if everyone understood the real importance of a connected society, i.e. one full of scientific information. When this happens, the process changes: subjects become more active and begin to take part in decision-making involving the scientific environment. In addition, they develop more critical thinking about what is presented to them in the media, for example, so as not to be the target of distorted information based on "scientific knowledge".

However, we see that there are currently teachers in schools who find it very difficult to develop contextualized activities. This is possibly because they are not trained to act and seek to intervene in their field of teaching according to the needs of their target audience (Villegas, 2014). It is clear that the initial training of these professionals is not enough to guarantee good performance in educational practice.

Therefore, it is important to seek to contextualize specific areas, with a view to preparing teachers so that they have the autonomy to carry out actions with innovative resources, taking into account shared action in the construction of scientific discourse.

---

enables citizens to reflect critically on the scientific-technological environment, enabling them to understand daily processes, make appropriate decisions and participate actively in the scientific-technological environment (Auler; Delizoicov, 2001).

Following this direction will promote contributions to society based on the principles of sustainability, greater social engagement and higher learning rates.

Taking this discourse into account, we found relevance in the development of Table 3, as it is a category that presents the importance of "participatory education", providing an understanding of what is listed in the documents studied, referring to dialog and interaction.

Table 3. Data to illustrate the Participatory Education category

Category	Registration unit	Context unit
Participatory Education	Dialog Interaction	<p>"The student, as a learner, constructs their knowledge by confronting their experience with the content presented by the teacher, through their social interactions and also through the exchanges established with their peers" (PPP, 2020, p. 20).</p> <p>"The school wants to offer the community a favorable environment for education, forming individuals capable of interacting in society, seeking partnership with the community. We know that strengthening this relationship enables the participation of the school community as well as building citizenship" (PPP, 2020, p. 22).</p> <p>"Use different languages - verbal (oral or visual-motor, such as Libras, and written), bodily, visual, sound and digital - as well as knowledge of artistic, mathematical and scientific languages, to express themselves and share information, experiences, ideas and feelings in different contexts and produce meanings that lead to mutual understanding" (Brasil, 2018, p. 09).</p> <p>"In the new world scenario, recognizing oneself in one's historical and cultural context, communicating, being creative, analytical-critical, participatory, open to new things, collaborative, resilient, productive and responsible requires much more than the accumulation of information" (Brasil, 2018, p. 14).</p>

Source: PPP (2020) and Brasil (2018)

A lot of research carried out in the educational field has shown the importance of interaction in school spaces, because when the construction of knowledge is thought out and developed in a shared way, the chances of success in teaching increase. Among these studies is the Inverted Classroom (Valente, 2018), whose mission is to promote interaction in order to help students in the teaching-learning process and in understanding concepts they feel blocked by. Another active methodology that provides us with many contributions

is Peer Instruction, which is carried out through various discussions between students, in the search for concrete results in the face of questions (Mazur, 2015). This is a totally positive occurrence, because as Vasconcellos (2004, p. 25) mentions, "through participation, the individual can assume the condition of subject and not object [...]". In this sense, there will be no room for the process of transmission and reception, as the student will also have the opportunity to expose what they know, and will not be limited to the teacher.

All of the above refers to theories that need to be urgently addressed in school practices, since traditional teaching methodologies that are applied without the addition of another different methodological practice often fail to contribute significantly to this process. It's not just today that many students have been diagnosed with school failure. That's why we need to change so that we can form participatory and autonomous subjects who can be part of society, exercising citizenship and making decisions in the processes that involve the scientific environment.

Faced with this transformation, the school plays a very important role, since it is through the work of educators that influence is exerted not only on the daily lives of students and their families, but also on the place where the school is located and society as a whole. However, in order to guarantee this direct interaction, it is necessary to know the social problems that are part of this reality, so that, with the knowledge built up, it is possible to take an active part in solving the problems that afflict them. In this way, it is possible to think of joint actions and achieve improvements for the entire school community.

In the midst of so many contemporary innovations, investigative and contextualized research in teaching would be an essential didactic proposal to guarantee the active participation of students. It differs from others in that it enables meaningful learning and the solution of relevant problems, allowing participants to present their hypotheses about the problems in their context.

However, it is a complicated process, as we are faced with several factors that negatively influence the application of these reflections. The main criteria we can cite are the availability of time, encouragement from government bodies, as well as interest and

willingness on the part of teachers to seek technological updates that meet the needs of professionals, in order to make lessons motivating and actions in the classroom satisfactory.

In addition to these criteria, we also need education professionals who are prepared to work in specific sectors, such as rural education. In addressing this issue, we list in Table 4 below the need to know how to act in the face of "Educational Diversity", our 4th category, as this is something that not only requires academic training, but also knowledge of the context of the subjects and their socio-cultural aspects.

Table 4. Data to illustrate the Educational Diversity category

Category	Registration unit	Context unit
Educational Diversity	Heterogeneity Culture Rural Education	Value the diversity of knowledge and cultural experiences and appropriate knowledge and experiences that enable them to understand the relationships inherent in the world of work and make choices in line with the exercise of citizenship and their life project, with freedom, autonomy, critical awareness and responsibility. (Brasil, 2018, p. 09). [...] promote an education aimed at welcoming, recognizing and developing them fully, in their singularities and diversities. (Brasil, 2018, p. 14). "[...] our explicit proposal in this document is focused on socio-educational work, educating together with families and the community so that we can encourage children to learn through their own world, stimulating their abilities and creating so that they can assimilate the knowledge around them" (PPP, 2020, p. 41). "[...] our duty is to prioritize aesthetic principles, sensitivity, playfulness and diversity. As support, we rely on ongoing training, based on methodological diversity, the political principles of the rights and duties of citizenship, the exercise of creativity and respect for the democratic order that will be made explicit and implemented through specific interdisciplinary and commemorative projects" (PPP, 2020, p. 17). "[...] Rural education differs from rural education because it is built by and for the different subjects, territories, social practices and cultural identities that make up the diversity of the countryside. It presents itself as a guarantee of expanding the possibilities for peasant men and women to create and recreate the conditions of existence in the countryside" (PPP, 2020, p. 25).

Source: PPP (2020) and Brasil (2018)

The sections defined in this category provide a critical view of the many aspects that need to be taken into account in education, especially for rural peoples, who represent a significant part of the process of educational inequality. Throughout this work, there have been various reflections on the needs of education, taking into account what cannot fail to be seen as relevant in the various educational sectors. This allows us to see that we are not the same; everyone has their own particularities and different cultures.

Segmented on this idea, it is possible to see that for an external examiner, everyday life is the same for everyone in a given community. However, when it is analyzed and observed in more detail, one begins to see that people differ significantly from one another. A clear and concise example is: "We all eat, sleep and dress. However, everyone does it in their own way" (Villegas; González, 2011, p. 3). These characteristics refer to a set of cultural diversities, something that can also be dealt with in the context of educational diversity.

There is one criticism that opens up room for great debate. This criticism refers to the persistence in working on global issues, when in fact the most important themes are left aside, that is, disregarded and seen as uninteresting. These topics, which we characterize as typical phenomena in the daily lives of individuals and communities, are in fact fundamental objects of knowledge to be discussed.

For this reason, teaching must be based on different curricula that reflect the context of each student community. It is also necessary to educate in partnership with families, taking into account the particularities of rural students, their fears, desires, curiosities and previous knowledge. These aspects transform individual experiences into collective ones, since the world around them is the stimulus for developing skills.

This thinking underpins rural education, something that is not a stopgap solution for urban education, but which has its own pedagogical planning, configured from the contextual reality. With this in mind, public policies have prioritized the education of people from rural areas. In addition to promoting the transformation of these subjects through academic growth, it is entirely considerable that, in their professional work, they work on



issues of time, space and the production of local knowledge better than other professionals. This is due to the fact that they gain this knowledge over the course of their lives.

Reflecting on what has been said, it is possible to see the importance of training rural teachers for the growth of education for people in the rural sector. Considerably, these professionals will see meaning in this action and will seek to bring the experience to their field of work, valuing the knowledge that their future students will have and demystifying the idea that the teacher is the owner of knowledge.

In this way, Rural Education becomes a teaching modality that makes it possible to articulate the knowledge built up throughout life, based on critical reflection, so that the subjects recognize and value themselves as peasants, without rejecting their origins. In this way, they will become agents who make contributions to their living spaces, seeking solutions to the problems that surround them on a daily basis. This is the conception of the subject that has been formulated, where each person must have the capacity to lead their life within social dictates, respecting cultural, ethical and religious diversity.

Faced with this educational and socio-cultural heterogeneity, we don't see it as a difficulty in teaching; on the contrary, we see possibilities that are fundamental to the construction of subjects. We know that it is in collectivity and diversity that we learn from each other. In this context, the transformation and motivation for a fairer and more egalitarian society that we so long for emerges.

Something important that is pointed out in the Pedagogical Political Project is the school's socio-educational work, since the teaching proposal is aimed at an education carried out in conjunction with the family and the school community, linking the knowledge acquired by the students with the world around them. From this perspective, there is a greater likelihood of learning.

Therefore, in the course of the content analysis, we were faced with the need to reflect beyond the general aspects of education. It is essential to analyze the documents in order to understand the design and application of the "Teaching Competences", which are shown in Table 5.

Table 5. Data to illustrate the Teaching Competences category

Category	Registration unit	Context unit
Teaching Competences	Skills Strategies	<p>In the BNCC, competence is defined as the mobilization of knowledge (concepts and procedures), skills (practical, cognitive and socio-emotional), attitudes and values to solve the complex demands of everyday life, the full exercise of citizenship and the world of work (Brasil, 2018, p. 08).</p> <p>"Contextualize the contents of the curricular components, identifying strategies to present them, represent them, exemplify them, connect them and make them meaningful, based on the reality of the place and time in which learning is situated" (Brasil, 2018, p. 16).</p> <p>"Effectively organize all the didactic resources necessary to develop the proposal that provides opportunities for everyone, through projects, pedagogical workshops, field classes and research, with reading as a means to interpret information, solve problems, among other aspects, learn meaningfully, promoting quality education" (PPP, 2020, p. 31).</p> <p>"2a.1.5 Plan teaching based on the curriculum, students' prior knowledge and experiences, making sure that the content of lessons is understandable to all students. [...] 2a.2 Plan teaching, developing strategies, objectives and assessments to ensure effective student learning [...]" (Brazil, 2020, p. 12)</p> <p>"Understand, use and create digital information and communication technologies in a critical, meaningful, reflective and ethical way in the various teaching practices, as a pedagogical resource and as a training tool, to communicate, access and disseminate information, produce knowledge, solve problems and enhance learning" (Brasil, 2020, p. 08).</p> <p>"[...] seek updating in their field and related areas, appropriate new knowledge and experiences that enable them to improve professionally and effectively and make choices in line with the exercise of citizenship, their life project, with freedom, autonomy, critical awareness and responsibility" (Brasil, 2020, p. 08).</p>

Source: PPP (2020); Brasil (2018); Brasil (2020)

For this category, we were able to formulate excerpts from the National Common Curricular Base, the Pedagogical Political Project and the National Curricular Guidelines for the continued training of basic education teachers. Faced with the contextual unit presented, we were able to understand that didactic competences are aimed at the

performance of actions, provided by skills or strategies that manage to reach the target audience and guarantee their learning.

However, as our focus of study is specifically Science Teaching, we will try to summarize our discussion based on the competences of this area. The aim is to promote student interest by relating science to technological applications and everyday phenomena. In addition, it aims to value the resources of the local context, be they personal or human, but which become useful for solving problems and propagating teaching that is capable of change.

Based on these principles, it is clear that the application of the strategies must be related to everyday life, nature, technology and society. As Marcuse (2009, p. 164) mentions: "Science, like all critical thinking, has its origins in the effort to protect and improve human life in its struggle with nature; the inner telos of science is nothing other than the protection and improvement of human existence." Thus, the construction of knowledge must start from the problems encountered and the questions posed by the students, such as: why do plants grow? How is food produced? How do day and night happen? These questions show strong signs that they want to understand the world around them.

Because of this concern, the strategies used for science skills should be geared towards improving the quality of life of individuals, as well as studies that seek to contribute to the active participation of students in making decisions that correspond to the scientific field and that discuss a possible world. The aim is to encourage students to research and look for hypotheses to solve the problems identified (Liguori; Noste, 2005).

In order to achieve the goal of forming critical and aware citizens who are prepared to exercise their citizenship, we must once again emphasize the need for professionals who are committed to joint practice and willing to seek out specific and innovative techniques. We shouldn't think that strategies and information will come to us without any effort. On the contrary, we must create stimulus, break out of our complacency, acquire new skills and ensure that the educational work is satisfactory, focusing directly on the student's learning.

Sequentially, we must seek to update our knowledge in our field and related areas in order to gain new knowledge, experience and professional development. These elements will make you aware of the importance of continuing education. The advance of science and technology has been progressive, so it is necessary to keep up or try to keep up. The appropriate use of digital information and communication technologies becomes an innovative, meaningful, reflective and ethical action in the various teaching practices.

In addition, it is essential that teaching is planned on the basis of the curriculum, students' prior knowledge and experiences. Teaching resources must be aligned with the proposal, so that they cater for all students, whether in a field lesson or an interpretive reading. These are essential actions that guarantee effective student learning.

## 4 Conclusions

In the light of the analyses carried out, it is worth highlighting the importance of teachers/researchers being familiar with the documents that guide the curriculum and the educational proposals in force, in order to avoid spontaneous and disconnected practice, often the result of experiences in school life as a student and/or as a professional.

Despite the various challenges already faced by basic education teachers, it is extremely important to seek, in conjunction with the education departments and other responsible bodies, continuing education processes that more effectively help to implement actions that should not just remain on paper. In this scenario, it is important to emphasize that reflecting on teaching should not be limited to the knowledge obtained in the specific and pedagogical training that began at graduation, but should permeate the professional's entire career.

In this way, we hope that this research does not just become a number in the statistics of works dealing with this subject, as we aim to trigger changes in this area of study, helping to reflect on what should be done in the context studied, according to the documents analyzed. In addition, we hope that the product of this research will become a basis for transforming many similar realities.

## References

BARBOSA, Gilvana Costa; FERREIRA, Márcia Maria Guimarães de Almeida; BORGES, Luzineide Miranda; SANTOS, Adilson Gomes dos. Tecnologias digitais: possibilidades e desafios na educação infantil. In: XI Congresso Brasileiro de Ensino Superior à Distância, 2014, Florianópolis. **Anais do XI Congresso Brasileiro de Ensino Superior à Distância**, Florianópolis, 2014, p. 1-16.

BARDIN, Laurence. **Análise de conteúdo**. São Paulo: Edições. v. 70, 2011. 229p.

BRASIL. Ministério da Educação. **Base Nacional Comum Curricular**. Brasília, 2018. Disponível em:

<[http://basenacionalcomum.mec.gov.br/images/BNCC\\_EI\\_EF\\_110518\\_versaofinal\\_site.pdf](http://basenacionalcomum.mec.gov.br/images/BNCC_EI_EF_110518_versaofinal_site.pdf)> Acesso em 03 de fev de 2021.

BRASIL. Ministério da educação, **Diretrizes Curriculares Nacionais para a formação continuada de professores da educação básica**. Disponível em:

<[http://portal.mec.gov.br/index.php?option=com\\_docman&view=download&alias=164841-rcp001-20&category\\_slug=outubro-2020-pdf&Itemid=30192](http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=164841-rcp001-20&category_slug=outubro-2020-pdf&Itemid=30192)> Acesso em 11 de fev de 2021.

BRASIL. Ministério da educação. **Diretrizes curriculares nacionais para a educação infantil**. Brasília: MEC/SEB, 2010. Disponível em:

<[http://portal.mec.gov.br/index.php?option=com\\_docman&view=download&alias=9769-diretrizescurriculares-2012&category\\_slug=janeiro-2012-pdf&Itemid=30192](http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=9769-diretrizescurriculares-2012&category_slug=janeiro-2012-pdf&Itemid=30192)> Acesso em 12 de mar de 2021.

COELHO, Marcelo Nunes. Uma comparação entre Team-Based Learning e Peer-Instruction em turmas de Física do Ensino Médio. **Revista Ensino Interdisciplinar**, v. 4, n. 10, p. 40-50, 2018.

DOS SANTOS, Aline Coêlho; CANEVER, Cristini Feltrin; GIASSI, Maristela Gonçalves; FROTA, Paulo Rômulo de Oliveira. A importância do ensino de ciências na percepção de alunos de escolas da rede pública municipal de Criciúma–SC. **Revista Univap**, v. 17, n. 30, p. 68-80, 2011.

FREIRE, Paulo. **Pedagogia da Autonomia: Saberes Necessários à Prática Educativa**. São Paulo: Paz e Terra, 1996.

GONÇALVES, Marianne Marimon; BRICK, Elizandro Maurício. Educação do Campo e Ensino de Ciências: Contribuições da Perspectiva Freireana para o Trabalho Docente. In: XI Encontro Nacional de Pesquisa em Educação em Ciências, 2017, Florianópolis.

**Anais do XI Encontro Nacional de Pesquisa em Educação em Ciências.**  
Florianópolis, 2017.

LIGUORI; Liliana; NOSTE, María Irene. **Didáctica de las Ciencias Naturales: Enseñar Ciencias Naturales.** Rosario: Homo Sapiens Ediciones, 2005.

LÜDKE, Menga; ANDRÉ, Marli EDA. **Pesquisa em educação: abordagens qualitativas.** São Paulo: E.P.U., 2012.

MARCUSE, H. A responsabilidade da ciência. **Scientiae Studia**, v. 7, n. 1, p. 159-164, 2009.

MAZUR, Eric. **Peer instruction: a revolução da aprendizagem ativa.** Porto Alegre: Penso Editora, 2015.

MOURA, Maria Aparecida. Construção social da cidadania científica: desafios. In: MOURA, Maria Aparecida *et al* (Org.). **Educação científica e cidadania: abordagens teóricas e metodológicas para a formação de pesquisadores juvenis.** Belo Horizonte: Prox. - UFMG, 2012, p. 19-29.

NÓVOA, António. Os Professores e a sua Formação num Tempo de Metamorfose da Escola. **Educação & Realidade**, v. 44, n. 3, 2019, e84910.

**PROJETO POLÍTICO PEDAGÓGICO:** Escola Municipal 13 de Maio, Upanema/RN, 2020.

VALENTE, José Armando. A sala de aula invertida e a possibilidade do ensino personalizado: uma experiência com a graduação em midialogia. In: Bacich, Lilian; Moran, José. **Metodologias ativas para uma educação inovadora: uma abordagem teórico-prática.** Porto Alegre: Penso, 2018, p. 26-44.

VASCONCELLOS, Celso dos Santos. **Coordenação do Trabalho Pedagógico: do projeto político-pedagógico ao cotidiano da sala de aula.** 5ª ed. São Paulo: Libertad, 2004.

VEIGA, Ilma Passos da. Projeto político-pedagógico da escola: uma construção coletiva. In: VEIGA, Ilma Passos da (org.). **Projeto político-pedagógico da escola: uma construção possível.** Campinas: Papyrus, 1998. p.11-35.

VILLEGAS, Margarita; GONZÁLEZ, Fredy. La investigación cualitativa de la vida cotidiana. Medio para la construcción de conocimiento sobre lo social a partir de lo individual. **Psicoperspectivas, individuo y Sociedad**, v. 10, n. 2, p. 35-59, 2011.



VILLEGAS, Margarita. La perspectiva históricocultural y su impacto sobre la investigación de la docencia. **Revista Actualidades Investigativas en Educación**, v. 14, n. 1, p. 1-17, 2014.

<sup>i</sup>**Aldefran Aderson da Silva Souza**: ORCID: <https://orcid.org/0000-0001-7601-401X>

Programa de Pós-graduação em Ensino (POSENSINO)

Mestre em Ensino, pelo POSENSINO. Associação entre Universidade do Estado do Rio Grande do Norte/Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte e Universidade Federal Rural do Semiárido.

Professor, Licenciado em Educação do Campo, com habilitação em Ciências Naturais pela Universidade Federal Rural do Semiárido - UFERSA.

Authorship contribution: Writing - First draft.

Lattes: <http://lattes.cnpq.br/7556229590536840>

E-mail: [profaldefransilva@gmail.com](mailto:profaldefransilva@gmail.com)

<sup>ii</sup>**Leonardo Alcântara Alves** ORCID: <http://orcid.org/0000-0003-4650-3140>

Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte, campus Apodi  
Doutor em Química pela Universidade Federal do Ceará. Docente Permanente do Programa de Pós-graduação em Ensino (POSENSINO). Associação entre Universidade do Estado do Rio Grande do Norte/Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte e Universidade Federal Rural do Semiárido. Professor Permanente da Rede Nordeste de Ensino (RENOEN), polo IFRN.

Authorship contribution: Writing - Proofreading, editing, and supervision.

Lattes: <http://lattes.cnpq.br/8433158222878164>

E-mail: [leonardo.alcantara@ifrn.edu.br](mailto:leonardo.alcantara@ifrn.edu.br)

**Responsible publisher:** Genifer Andrade

**Ad hoc expert:** Eder Ahmad Charaf Eddine e Jefferson da Silva Moreira.

## How to cite this article (ABNT):

SOUZA, Aldefran Aderson da Silva.; ALVES, Leonardo Alcântara. O ensino de ciências para Educação do Campo: analisando os documentos que regem a escola. **Rev. Pemo**, Fortaleza, v. 6, e12563, 2024. Available at: <https://revistas.uece.br/index.php/revpemo/article/view/12563>

Received on February 17, 2024.

Accepted on July 12, 2024.

Published on August 8, 2024.